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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Donald C. Abbott, et al Art Unit: 3729
Application No.: 09/514,762 Examiner: Chang, Rick Kiltae
Filed: 02/28/2000 Docket: TI-26904
For: **DOUBLE SIDED FLEXIBLE CIRCUIT FOR INTEGRATED CIRCUIT
PACKAGES AND METHOD OF MANUFACTURE**

AMENDMENT 37 CFR 1.115

May 30, 2002

Assistant Commissioner
for Patents
Washington, D.C. 20231

MAILING CERTIFICATE UNDER 37 C.F.R.1.8(A)
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Washington, D.C. 20231 on May 30, 2002

Sue Gleason
Sue Gleason

May 30, 2002
Date

Sir:

Responsive to the Office Action of January 30, 2002, please amend the application as follows:

Change the tile to read:

METHOD OF FABRICATING FLEXIBLE CIRCUITS FOR INTEGRATED CIRCUIT INTERCONNECTIONS

Please substitute the enclosed Abstract for the original abstract.

Amend Claims 16 and 18, as follows:

16. (Amended) A method of manufacturing an intermediate base structure for a flex circuit including the steps of:

a) [forming a plurality of apertures corresponding to a pattern of conductive vias in] providing a flexible base polymer film having first and second surfaces and a layer of copper on the first surface; [by mating].

- b) providing a metal matrix embossing tool [as described in claim 10 to the second surface,] comprising a copper film having a plurality of transverse studs integral therewith; placing said tool studs in contact with said second surface;
- c) applying a force to said metal matrix so that the studs of the tool punch through the copper coated polymer film, thereby creating a plurality of vias filled with the studs, and attaching the film matrix to the second side of the flex film.)
- d) electroplating a thin film of copper onto both sides of the copper clad flex film)

18. (Amended) A method of manufacturing a flex circuit on a flexible base polymer film including the steps of:

- a) superimposing an embossing tool having raised areas comprising a pattern of conductors and vias corresponding to a circuit design, wherein, said raised areas are coated with a thin layer of metal, comprising copper,
- b) applying heat and pressure to simultaneously emboss the film and to transfer said thin metal layer from the embossing tool to the [dielectric] polymer film,
- [b] c) removing the embossing tool,
- [c] d) embossing a pattern corresponding to that of the second surface of a flex circuit, and simultaneously transferring a thin layer of metal into the embossed pattern,
- [d] e) physically removing the embossing tool,
- [e] f) plating a layer of copper to fill the vias and conductor patterns on both sides of the film, [and]
- [f] g) plating a layer of nickel and gold onto the exposed copper patterns[.] , and
- [g] h) applying a solder mask on the surface of the film surrounding the solder ball contact pads.